

SHORT COMMUNICATION

***Hydrocharis dubia* (Blume) Backer (Hydrocharitaceae)
is an alien species in Australia****A.R. Bean**

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Hydrocharis dubia (Blume) Backer, is an aquatic plant with a white 3-petaled flower that occurs widely in eastern Asia. It has been accepted as an indigenous species in Australia but recently this has been repeatedly questioned by weed control authorities. This note examines the evidence relating to its origin status and concludes that it is not native in Australia.

The genus *Hydrocharis* L. was revised by Cook & Luond (1982), with the recognition of three species, *H. morsus-ranae* L., *H. chevalieri* (De Wild.) Dandy and *H. dubia*. *Hydrocharis morsus-ranae* is widely distributed in Europe, with scattered occurrences in western Asia. It has become a serious weed in south-eastern Canada (Cook & Luond 1982) and in the north-eastern U.S.A. (Catling *et al.* 2003; O'Neill 2007). *Hydrocharis chevalieri* is restricted to central Africa, and is not recorded as a weed. *Hydrocharis dubia* is widely distributed in south-eastern Asia, from India to Japan and south to Java and New Guinea, and in Australia (Cook & Luond 1982). It has been referred to as a “noxious weed” in Japan (Oki 1994). Shaffer-Fehre (1991) transferred *Hydrocharis dubia* to *Limnobium*, a genus which until then had comprised two species confined to the Americas; however, this transfer has not been followed in the *Flora of Australia* (Jacobs & McColl 2011) and is not supported by molecular data (Les *et al.* 2006).

Hydrocharis dubia was first recorded for Australia by Benthams (1873) under the misapplied name *H. morsus-ranae*. The record

was based on a specimen (now at K) collected by J. Bidwill, from “Wide Bay” between 1848 and 1853. This specimen was cited by Cook & Luond (1982) under *Hydrocharis dubia*. Benthams (1873) entertained the idea that it could be an introduced species in Australia.

Bailey (1902) recorded *Hydrocharis morsus-ranae* from “the still waters about the Brisbane River”. There is a specimen record of *Hydrocharis dubia* on the BRI database with the locality “Brisbane River”, but the specimen cannot currently be located.

Hydrocharis dubia has been found at 13 Australian locations in Queensland (Qld) and New South Wales (NSW) based on herbarium records (Table 1).

Hydrocharis dubia (as *Limnobium dubium* by some authors) has been regarded as an indigenous species in Australia (Aston 1973; Stanley & Ross 1989; Jacobs 1993; Holland & Hansen 2009; Jacobs & McColl 2011). The reasons for this have not been expounded, but they are probably two-fold: that the species is indigenous to south-east Asia, and natural dispersal from that region to Australia is not an unreasonable hypothesis; and that the species is included in Benthams’s *Flora Australiensis*. Thomas & McDonald (1989) gave *Hydrocharis dubia* a status of ‘2V’, meaning a Vulnerable species with a geographic range in Australia of less than 100 km. Presumably the authors, at that time, considered it native to south-eastern Queensland. Subsequently it was classified as “Vulnerable” under the Queensland Nature Conservation Act 1992, and “Vulnerable” under the Environment Protection and Biodiversity Conservation Act 1999.

Table 1. Locations for *Hydrocharis dubia* in Australia over time

Localities	Time period of collections
Wide Bay, Qld	1848–1853
Clarence River, NSW	1882
Brisbane River, Qld	pre-1902
Harrisville, Qld	1960, 1985, 1986
Bountiful Creek, Richmond River, NSW	1967
Frederickton near Kempsey, NSW	1968
Beaudesert, Qld	1971, 1977
Toomba, Qld	1977, 1996, 1997, 2001, 2008
16 km W of Casino, NSW	1978
Ayr, Qld	1994
Rosewood, Qld	1999, 2001, 2009
Fletcher Ck, Qld	2002, 2004
Giru, Qld	2004

The following observations are made on *Hydrocharis dubia* in Australia drawing on criteria used by Bean (2007) to assess its origin status:

1. it grows in disturbed or modified sites, and has not been found in remote “intact” areas. This is consistent with a species introduced by man, and transported to other sites via machinery or with soil, or dumping of plants
2. it is persistently invasive (one label reports it covering two dams), and is not in ecological balance with surrounding biota
3. it does not appear to have any pests or diseases, suggesting it has arrived recently in evolutionary terms
4. it has substantially expanded its geographical range over the last 40 years (see list of locations above)
5. its distribution is highly discontinuous, and the discontinuities cannot be explained by climatic or other natural criteria
6. the initial locations in Australia are highly disjunct geographically from nearest known occurrences in Asia
7. the first record for Australia (Wide Bay, between 1848 and 1853, by John Bidwill) is not early enough to preclude human introduction

Hydrocharis dubia fails all of the ecological criteria for an indigenous species, and the historical criteria are equivocal. In the key of Bean (2007) it readily keys to “alien” (1x, 2).

In conclusion, there is a strong weight of evidence to support an alien status for *Hydrocharis dubia* with regard to its occurrences in Australia. I recommend that this species be recorded as naturalised for Australia, and de-listed from the *Queensland Nature Conservation Act 1992*, and the *Environment Protection and Biodiversity Conservation Act 1999*.

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